

### ABSTRACT

The present invention teaches a marker useful for detection and measurement of free radical damage. Specifically, the invention takes advantage of alterations which occur to the N-terminus of the albumin molecule, a circulating protein in human blood, in the presence of free radicals. These alterations effect the ability of the N-terminus of the albumin molecule to bind metals. Methods for detecting and quantifying this alteration include evaluating and quantifying the cobalt binding capacity of an albumin- containing sample, analysis and measurement of the ability of albumin to bind exogenous cobalt, detection and measurement of the presence of copper in a purified albumin sample and use of an immunological assay specific to the altered form of serum albumin which occurs following free radical damage. Also taught by the present invention is the use of the peptide Asp Ala His Lys and the compound Asp-Ala-His-Lys-R, wherein R is any chemical group capable of producing a detectable signal when a metal ion capable of binding to the N-terminus of naturally-occurring albumin is bound to the compound, for detection and quantitation of the marker. Methods of the present invention also include use of the marker as a "biochemical tag," thereby allowing for sensitive detection and measurement of the efficacy of clinical drugs and therapeutics which result in the generation of free radicals or which act to limit free radical damage. The marker also acts as a "biological tag" of a process implicated in a wide array of diseases and conditions and, accordingly, may be used to monitor and assess such diseases and conditions. Finally, the invention provides antibodies, immunoassays, and kits for use in detecting or quantitating the marker.